

JES DIABLO PRINTERINTERFACE MISCELANEOUS INFORMATION

LAST UPDATE : 22/03/87

DEFINITION OF SYSTEM

MEMORY MAP:

0000H-1FFFH 2 * 2732 4K EPROM (1*8K): SYSTEM SOFTWARE
8000H-BFFFH 2 * 6264 8K STATIC RAM: BUFFER AND SCRATH
4000H-401FH MEMORY MAPPED I/O: SEE BELOW

TIMING LOOPS ARE BASED ON A CLOCK FREQUENCY OF 1.536 MC.(2.2MC.)

4000H-400BH: DIABLO PRINTER CONTROL PORTS:

4000H: OUTPUT

BIT 0 : DATA 1
BIT 1 : DATA 2
BIT 2 : DATA 4
BIT 3 : DATA 8
BIT 4 : DATA 16
BIT 5 : DATA 32
BIT 6 : DATA 64
BIT 7 : DATA 128

4004H: OUTPUT

BIT 0 : DATA 256
BIT 1 : DATA 512
BIT 2 : DATA 1024
BIT 3 : RESTORE. LOW ACTIVE
BIT 4 : PRINTER WHEEL STROBE. ACTIVE ON NEGATIVE TRANSITION
BIT 5 : CARRIAGE STROBE. ACTIVE ON NEGATIVE TRANSITION
BIT 6 : PAPER FEED STROBE. ACTIVE ON NEGATIVE TRANSITION
BIT 7 : RIBBON LIFT

4008H: INPUT

BIT 0 : PRINTER READY. LOW INDICATES PRINTER READY
BIT 1 : CHECK. LOW INDICATES INVALID CARRIAGE POSITIONING.
BIT 2 : PAPER OUT. CURRENTLY NOT USED
BIT 3 : PRINTER WHEEL READY. LOW INDICATES READY FOR CHAR. COM.
BIT 4 : CARRIAGE READY. LOW INDICATES READY FOR CAR. MOVE COM.
BIT 5 : PAPER FEED READY. LOW INDICATES READY FOR FEED COMMAND.
BIT 6 : CURRENTLY NOT USED.
BIT 7 : CURRENTLY NOT USED.

4010H-8013H: PPI FOR KEYBOARD, SWITCHES AND LEDS:

4010H: SWITCH INPUT (MODE 0)

BIT 0 : DUPL
BIT 1 : LOCAL/LINE (0=LOCAL)
BIT 2 : HOP, DEFAULT WIDTH & HEIGHT
BIT 3 : VTO, DISPLAY FEED ENABLE SWITCH
BIT 4 : NOT USED
BIT 5 : S1, MODE SWITCH
BIT 6 : ALF
BIT 7 : TTY

4011H: KEYBOARD DATA INPUT PORT (MODE 1)

4012H: BIT 0 : HIGH INDICATES CHARACTER IN KEYBOARD BUFFER
BIT 1 : HIGH INDICATES KEYBOARD BUFFER FULL
BIT 2 : INT: INTEB, EXT: KEYBOARD STROBE
BIT 4 : BEEP OUTPUT LINE
BIT 5 : RD LED OUTPUT
BIT 6 : KBE LED OUTPUT
BIT 7 : CD LED OUTPUT

4013H: PPI CONTROL PORT

4014H-4017H: HOST INPUT PPI

4014H: PARALLEL DATA REGISTER

4016H: STATUS REGISTER

BIT 3 : HIGH WHEN CHARACTER PENDING IN INPUT BUFFER

4017H: PPI CONTROL REGISTER

Diablo interface cable definition

Diablo side	Interf. side	Type I/O	Definition
h	HH	I	Data 1
j	JJ	I	Data 2
m	MM	I	Data 4
f	FF	I	Data 8
k	KK	I	Data 16
i	EE	I	Data 32
q	NN	I	Data 64
d	DD	I	Data 128
b	BB	I	Data 256
V	V	I	Data 512
F	LL	I	Data 1024
E	E	I	Restore
P	P	I	Printer wheel strobe
K	K	I	Carriage strobe
C	C	I	Paper feed strobe
S	S	I	Select printer
H	H	I	Select ready
M	M	I	Ribbon lift
a	AA	O	Printer ready
B	B	O	Check
R	R	O	Paper out
Y	Y	O	Print wheel ready
W	W	O	Carriage ready
c	CC	O	Paper feed ready
L	F	O	External reset
Z	-		Not used
C	-		Not used
A	A		Ground
D	D		Ground
J	J		Ground
N	N		Ground
T	T		Ground
U	U		Ground
X	X		Ground

**** Bes Diablo printer interface manual ****

Version 1.2

(C) 1983 Bes company

Summary

The here deccribed interface enhances the Diablo model 1200 HyType I printer with the "intelligence" needed to use it either as a smart printer, or as a stand alone typewriter. These seperate functions are called "modes". The first allows several options to be set, which influence the actual printing, but does limit the operation to "downwards" printing, and direct keyboard input should not be used. In the second mode, entered characters are directly printed, operation as a typewriter. Allowed are reverse linefeeds. But this mode does not support paging, pagenumbering, pagetiteling etc. The communication to the host computer is parallel which allows fast receiving of characters into the interface's buffer.

Control characters.

The following control characters are supported:

Mode 1:

7/07H Produce audible signal.
10/0AH ALF off: linefeed.
ALF on: carriage return, linefeed.
11/0BH Unconditional pagefeed.
12/0CH Conditional pagefeed.
13/0DH ALF off: carriage return.
ALF on: carriage return, linefeed.
14/0EH Ribbon up
15/0FH Ribbon down
27/1BH Escape: start option command.

Mode 2:

2/02H Clear tabs.
3/03H Clear margines.
7/07H Produce audible signal.
8/08H Backspace.
9/09H Do tab.
10/0AH ALF off: linefeed.
ALF on: carriage return, linefeed.
13/0DH ALF off: carriage return.
ALF on: carriage return, linefeed.
14/0EH Ribbon up.
15/0FH Ribbon down.
17/11H Set tab.
18/12H Clear tab.
19/13H Set left margine.
20/14H Set right margine.
24/18H Backspace.
25/19H Advance.
26/1AH Linefeed.
28/1CH Carriage return.
29/1DH Inverse linefeed.

Programmable options

Several useful options can be set using option commands. These

commands are preceded by the ascii code for escape. In mode 1, and with option E=Y specified, the character sequence '(*)' is also recognized as an escape. Leading characters on the line are ignored. Option commands are not printed, except when they contain syntax errors. The message 'BAD PARAMETER(S)' emphasises the error. Currently the following commands are implemented:

- A=Y/N Up arrow handling control. A=Y causes the ascii character 5BH to be replaced by the character 7CH, overstruck by the character 5EH, which result for most characterwheels in a quite good replacement for an up arrow. A=N does not change the character 5BH. Default is A=N.
- B=Y/N Bidirection printing control. B=N disables bidirectional printing. Default is B=Y. (Mode 1 only)
- C=XXX Set characters/line. Valid range is 1-²⁸⁰~~138~~. When exceeding this number of characters, the rest of the line is printed on the next line. Default is C=138.
- D=Y/N Double strike control. D=Y causes every character to be printed twice, causing a more dark character. This slows down printing significantly. Default is D=N.
- E=Y/N Escape sequence recognition flag. E=Y enables the sequence '(*)' to be recognized as an escape. Default is E=Y. (Mode 1 only)
- H=XXX Set lines between pages. Valid range is 0-20. Default is H=6. (Mode 1 only)
- L=XXX Set lines/page. Valid range is 0-200. L=0 disables paging. Default is L=0. (Mode 1 only)
- N New page command. This command should not be followed by any other option, because the rest of the command is ignored. (Mode 1 only)
- P=N/XXX Set page-numbering. P=N disables page numbering, P=XXX sets pagenummering with first page number XXX. The pagenumber is printed at the upper right top of the page. Pagenummering is only enabled when the following conditions are met:
- At least 3 lines/page
 - At least 10 characters/line
- If, after interpreting the rest of the command, the printer is at the top of a page, the pagenumber is printed immediately. You can force the printer to do this by including a 'L=XXX' command, which resets the linecounter. Valid range is 0-65529. Default is P=N. (Mode 1 only)
- Q=XXX Set steps/line. Valid range is 1-255. The default value depends on the letterwheel size switch HOP: switch up sets Q=7, down to Q=8.
- R Reset all options to their default values. This command overrules all leading commands. The R option has the same effect as specifying:
- A=N, B=Y, C=138, D=N, E=Y, H=6, L=0, P=N, S=Y, T='', X=N, Z=Y
- The default values for W and Q depends on the letterwheel size switch HOP: switch up: W=5, Q=7, down: W=6, Q=8.
- S=Y/N Lowercase enable flag. S=N disables printing of lowercase characters. Default is S=Y.
- T='TITLE' Page title specification. The string between the single quotes is printed at the top of every page. If Pagenummering is specified, the pagenumber appears on the same line. The title line is followed by an empty line. T='' disables titeling. Titeling is only enabled when the following conditions are met:

- At least 3 lines/page
- At least 10 characters/line

If, after interpreting the rest of the command, the printer is at the top of a page, the titleline is printed immediately. You can force this by including a 'L=XXX' command, which resets the linecounter.
Valid stringlength range: 0-80 characters. Default is T=''. (Mode 1 only)

V This command produces a software copyright notice, and the version number of the resident interface program. Any characters following this command are ignored, and the escape sequence is terminated.

W=XXX Set steps/character. Valid range is 1-255. The default value depends on the letterwheel size switch HQP: switch up sets W=5, down to W=6.

X=Y/N Set individual sheet flag. When paper is feed to a new page and the option X=Y is specified, the printer produces an audible signal, and wait for CAR RET to be pressed on its keyboard before continuing printing, in order to allow the operator to enter a new sheet. Default is X=N. (Mode 1 only)

Z=Y/N Set zero-slashing. Z=Y causes the character '0' to be printed as the character '0' overstruck with the character '/'. Default is Z=Y.

***** Optional command line terminator. All trailing characters on the line are skipped.

Both upper and lowercase characters are accepted. Spaces are ignored, except in the T command titling. Options not valid under the specified mode are not assumed to be in error. Switching modes does not alter any options set, causing only those options not valid under the new mode to be disabled temporary.

Switches

As this intelligent interface has most options software programmable, not all switches provided on the diablo keyboard are supported. Those who are, are described below:

Line/Local This switch determines the source of input for the diablo. Line-mode restricts input to host only, local to keyboard only. Therefore, this switch can be used to stop printing of host output temporarily. No data from the host is lost during local mode.

Reset Pressing this switch causes the whole system to be reset to the same state as during powering-up. Use this switch only after fatal errors, and to flush the hostbuffer.

HQP The default lettersize depends on the position of this switch. Up for 15 char/inch, down for 12 char/inch. This switch is only sensed during powering-up, and reset, and has no effect afterwards.

ALF Automatic linefeed switch. When up, a linefeed (0AH) is inserted after every carriage return (0DH).

VTO Display feed option switch. When up, the diablo automatically feeds the paper up 16 steps when no characters are entered in the last 3 seconds. This allows the operator to see what is printed last.

S1

Mode switch. Up sets the system in mode 2, the typewriter mode. Down to mode 1, the intelligent printer mode.

Indication leds

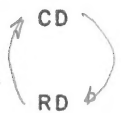
All four indication leds are supported:

Power On whenever the system is operating

KBE Keyboard enable led. Keyboard entries are possible whenever this led is on

CD Is on whenever the host buffer contains character to print.

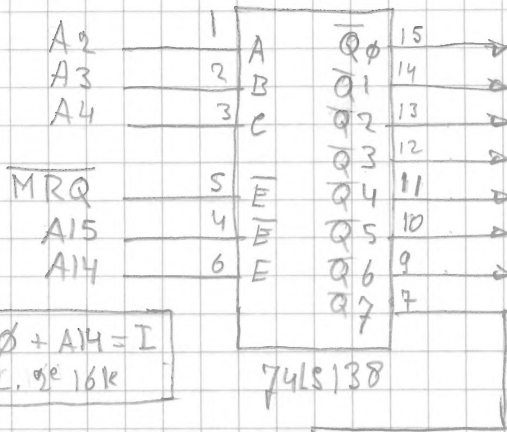
RD Is on when the host input buffer is full.



DIABLO KEYBOARD

1C FS	11H (17)	!	@	#	\$	%	SEC	&	*	()	—	+	TM	Ø8	TF	Ø5	7F
1D GS	Ø9 TAB	1	2	3	4	5	6	7	8	9	0	—	=	10	0	BS	ESC	DEL
1E RS	Ø9 TAB	Q	W	E	R	T	Y	U	I	O	P	—	—	—	—	—	Ø1	Ø3
1F US	Ø9 TAB	Q	W	E	R	T	Y	U	I	O	P	—	—	—	—	—	Ø1	Ø3
ØB NT	Ø9 TAB	Q	W	E	R	T	Y	U	I	O	P	—	—	—	—	—	Ø1	Ø3

2nd 16K BLOCK

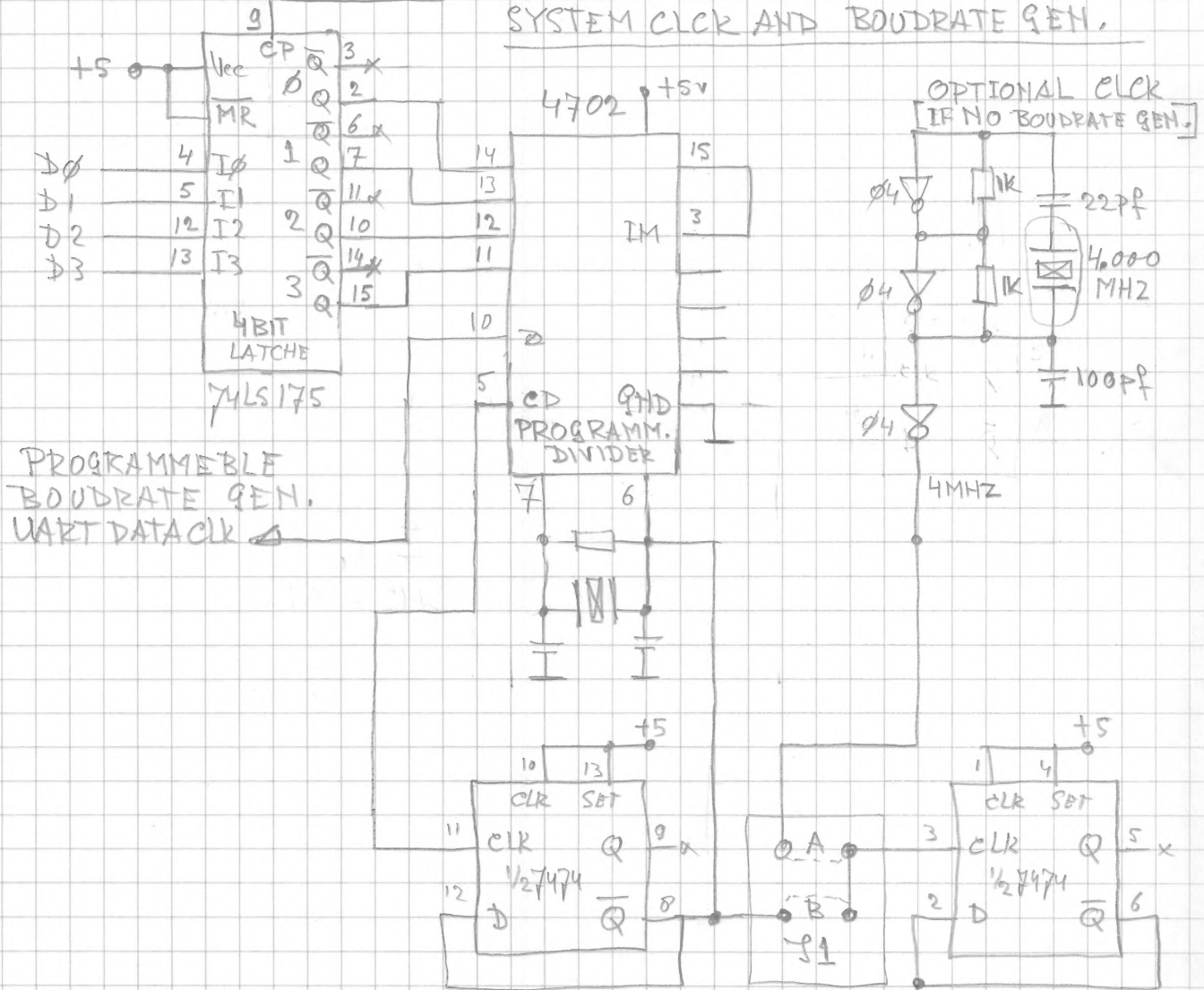


LOW COM = SEL1
 HIGH COM = SEL2
 STATUS = SEL3
 NOT USED = SEL4
 0255 = SEL5
 0251 = SEL6
 0212 = SEL7
 LATCH = SEL8

4000	4003
4004	4007
4008	400B
400C	400F
4010	4013
4014	4017
4018	401B
401C	401F

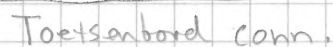
A15 = 0 + A14 = 1
 SEL. 2nd 16K

SYSTEM CLK AND BOUDRATE GEN.

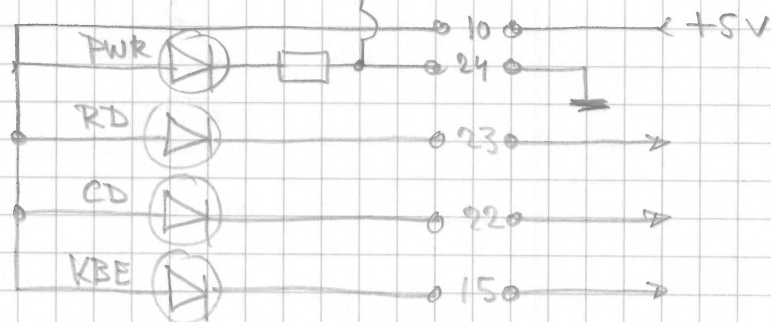
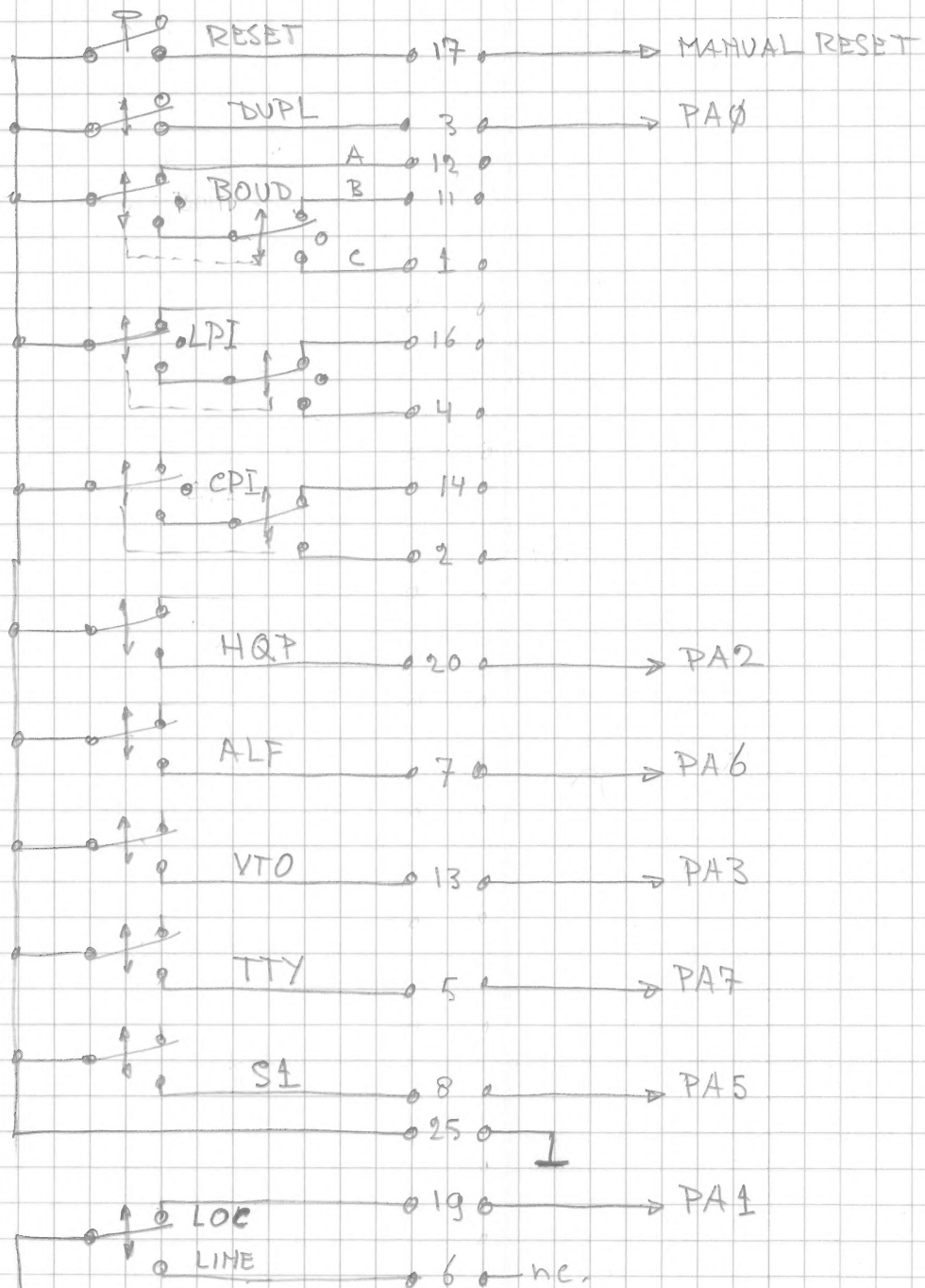


QA = 2MHz SYSTEM CLK

QB = ... MHz SYSTEM CLK
 AND UART DATA CLK

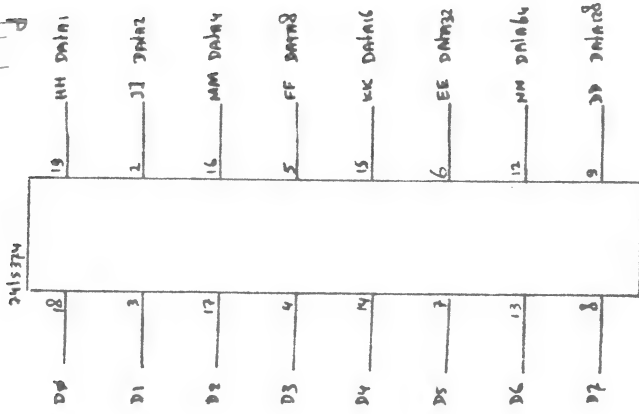


2	+ 5
3	- 12
6	D0
7	X1
8	D2
9	D3
10	D6 →
11	D4
14	STB →
15	D5 →
16	RPT →
17	QHD
18	QHD
19	QND



I/O LATCHES + CONTR. BUFF. 10+300

P4



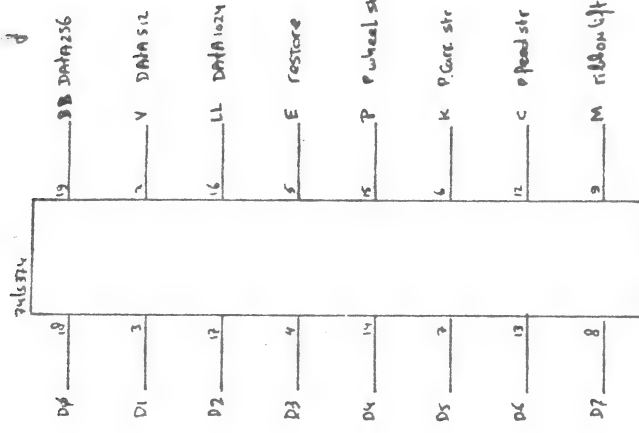
©1983 SMD

Latch SEL4

Power 74374

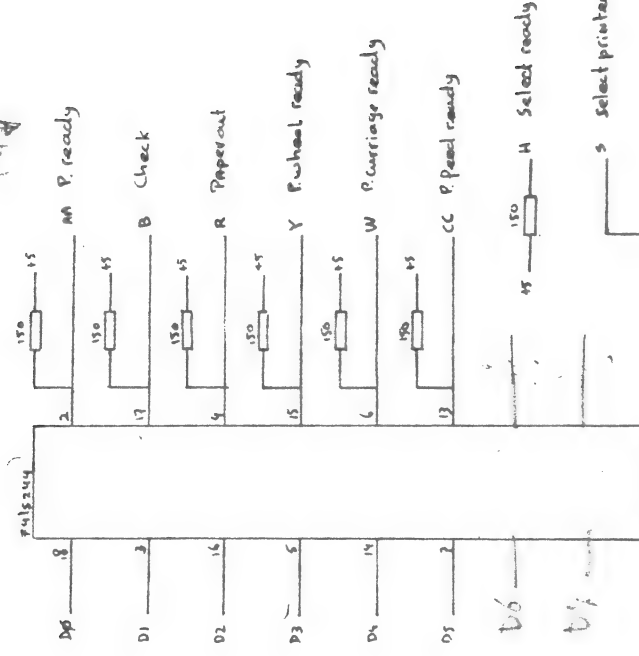
+5	20	10
0	10	10

P4



Latch SEL2

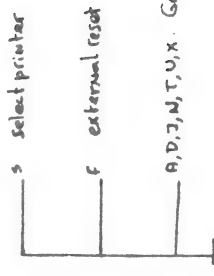
P4

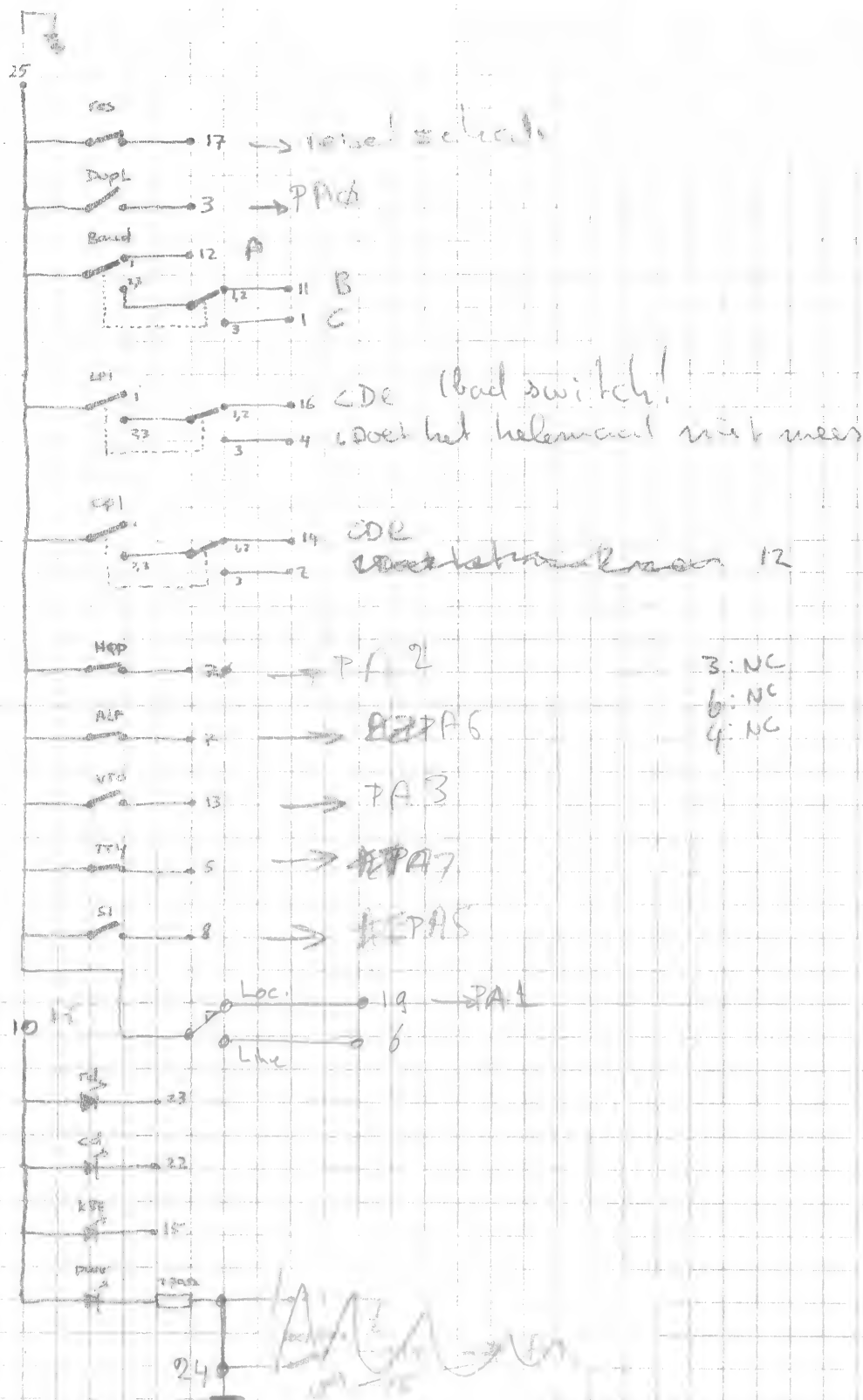


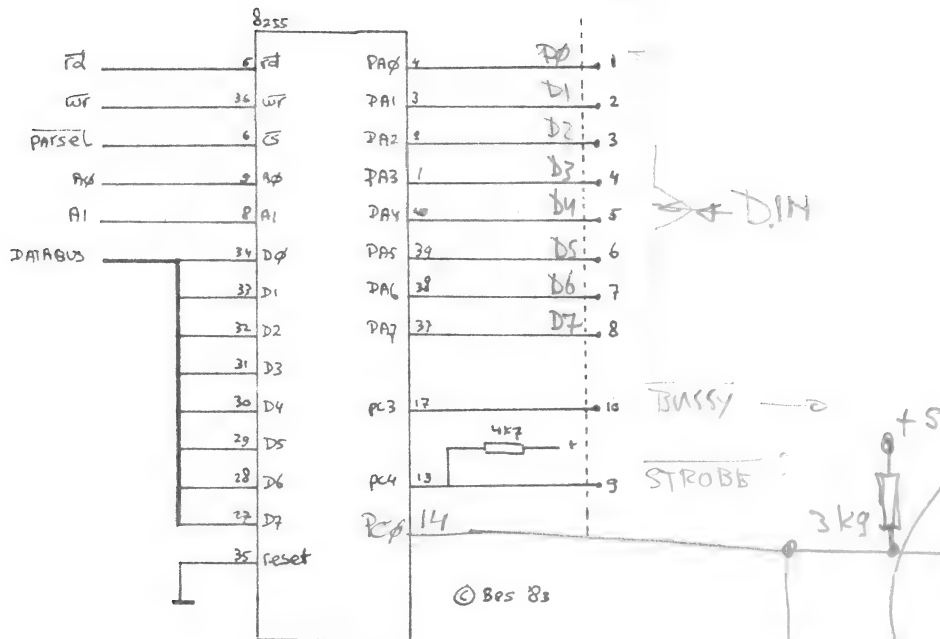
Buffer SEL3

.A	.B
.C	.D
.E	.F
.G	.H
.I	.J
.K	.L
.M	.N
.O	.P
.Q	.R
.S	.T
.U	.V
.W	.X
.Y	.Z
.AA	.BB
.CC	.DD
.EE	.FF
.GG	.HH
.II	.JJ
.KK	.LL
.MM	.NN

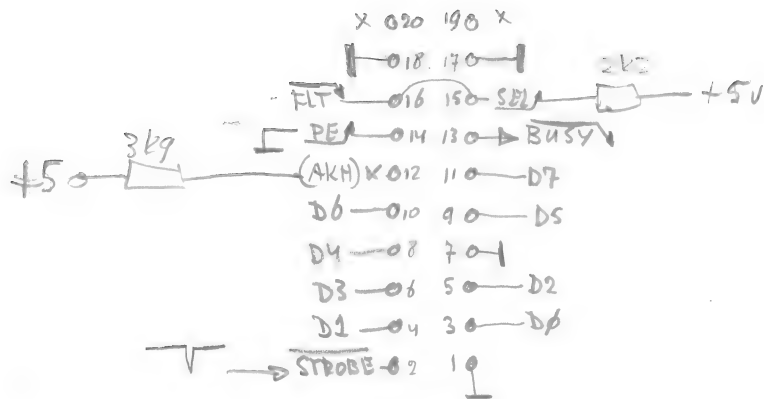
P4





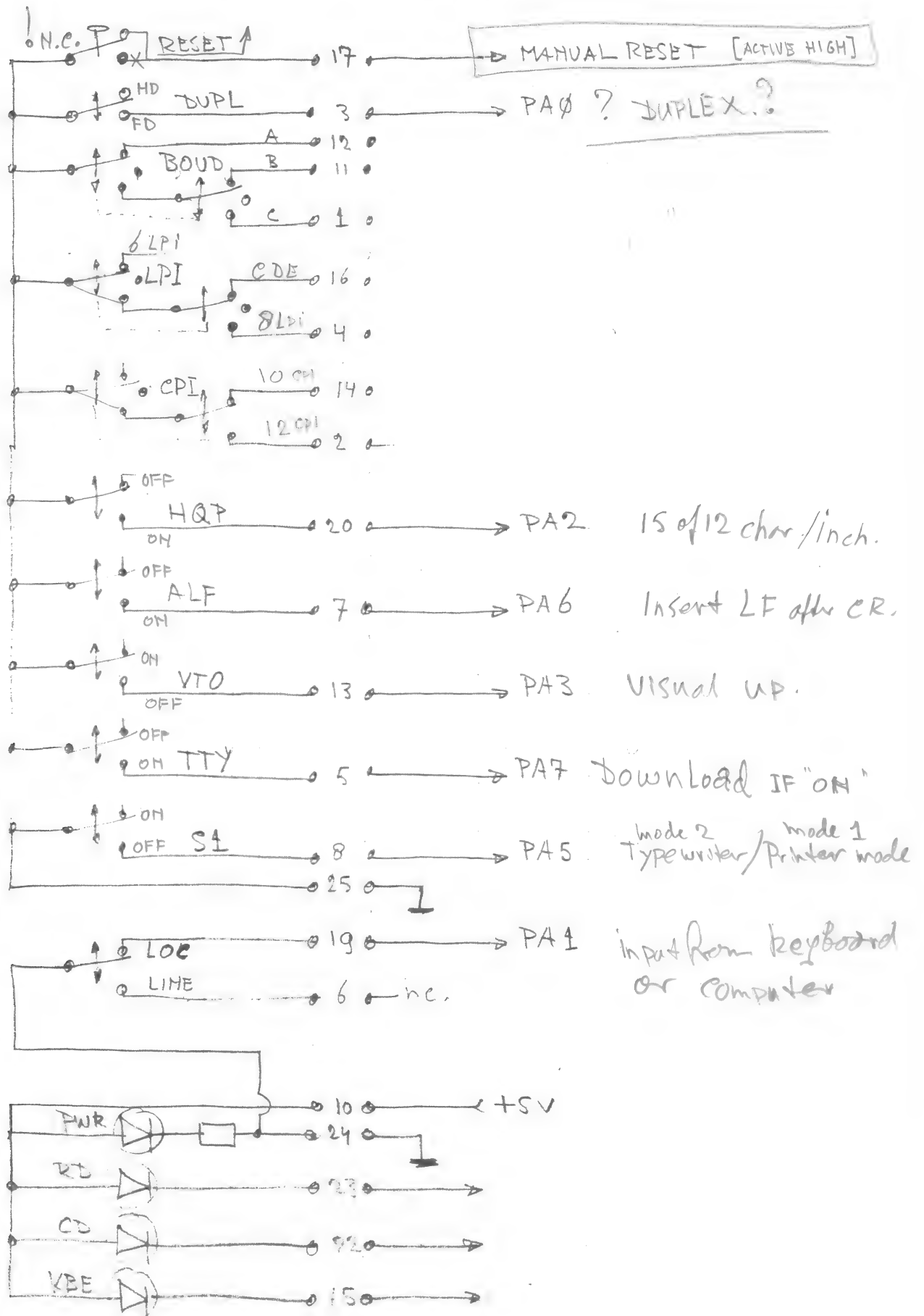


Power: gnd to 7, vcc to 26

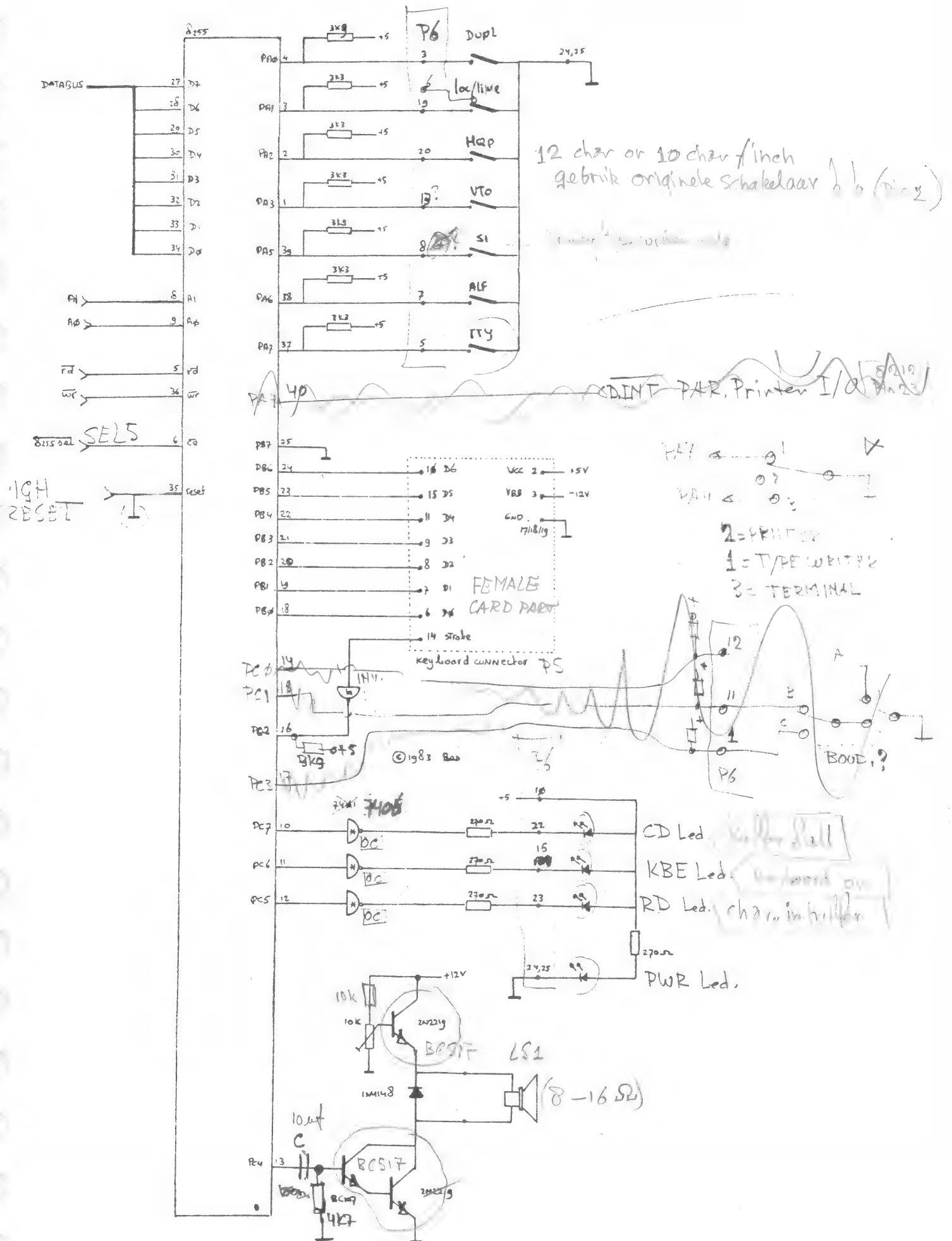


HCT 300

SWITCH CABLE P6 FEMALE



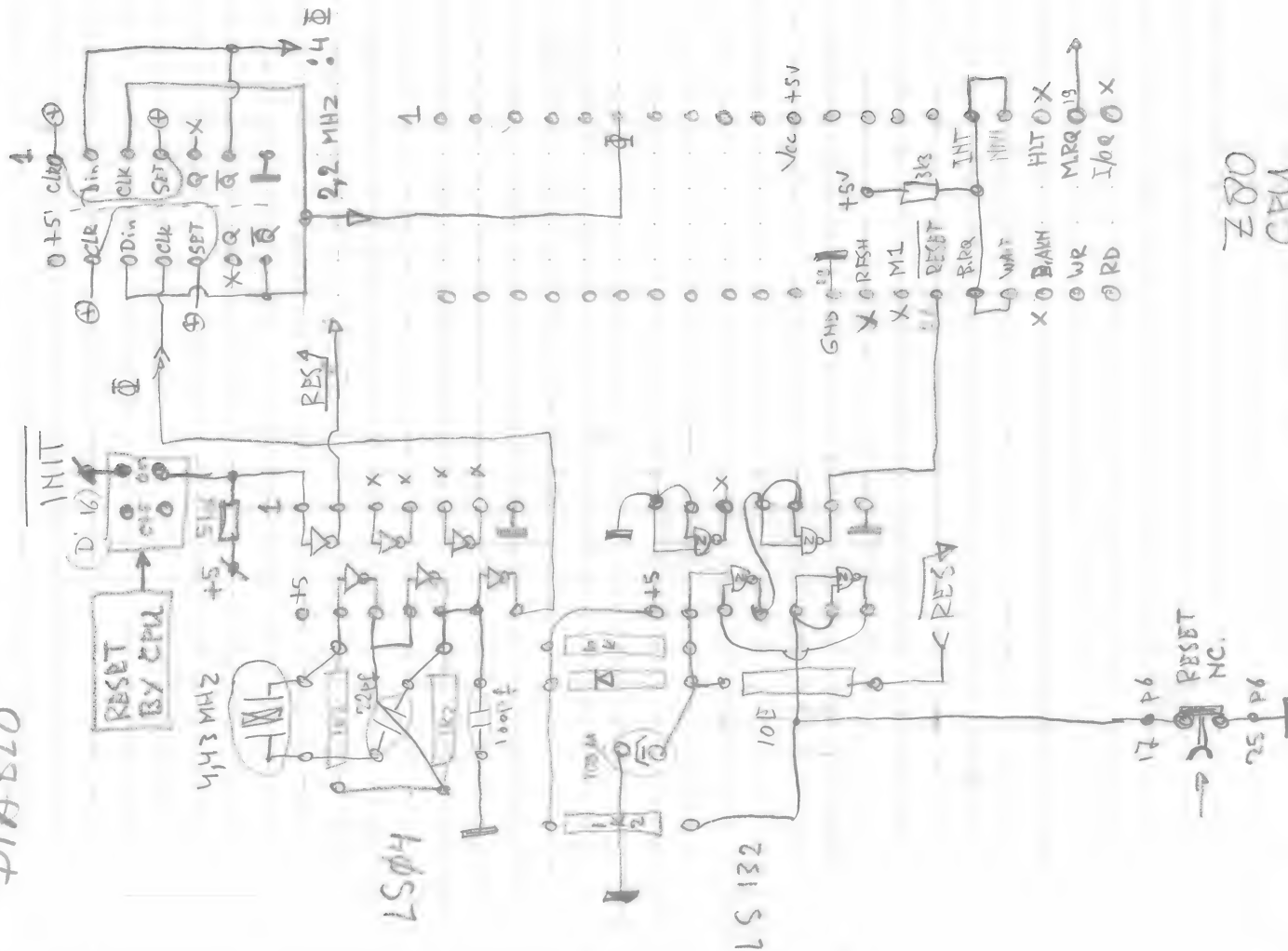
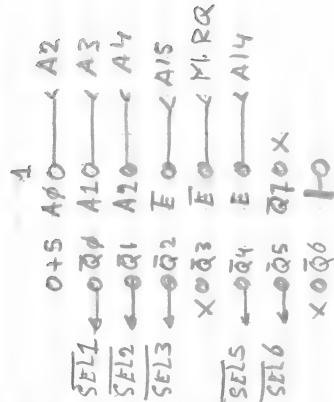
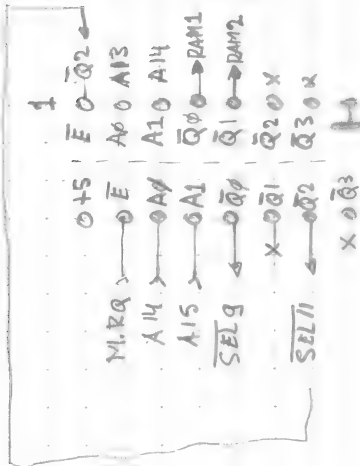
CONTROL I/O HCT 300

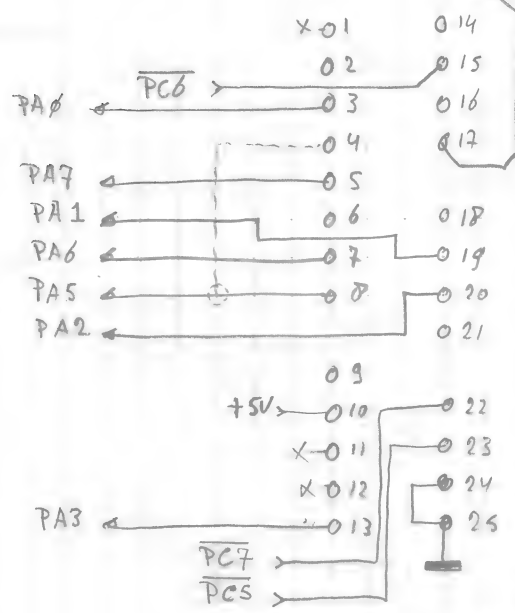
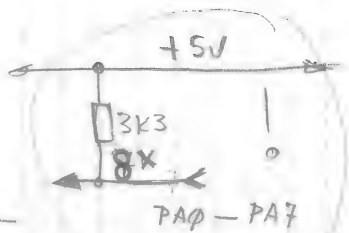
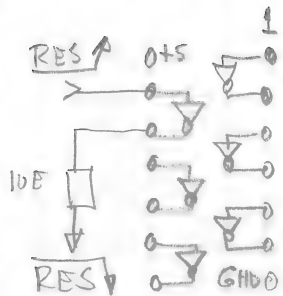


PIAZZO

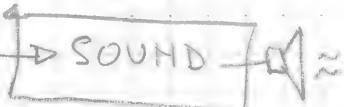
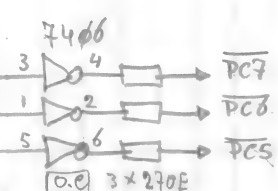
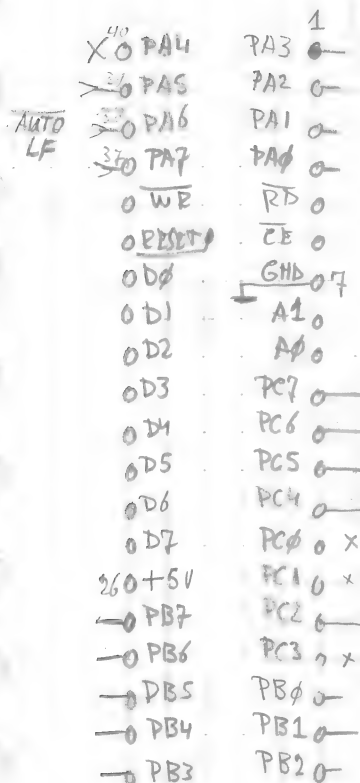
63157

LS138

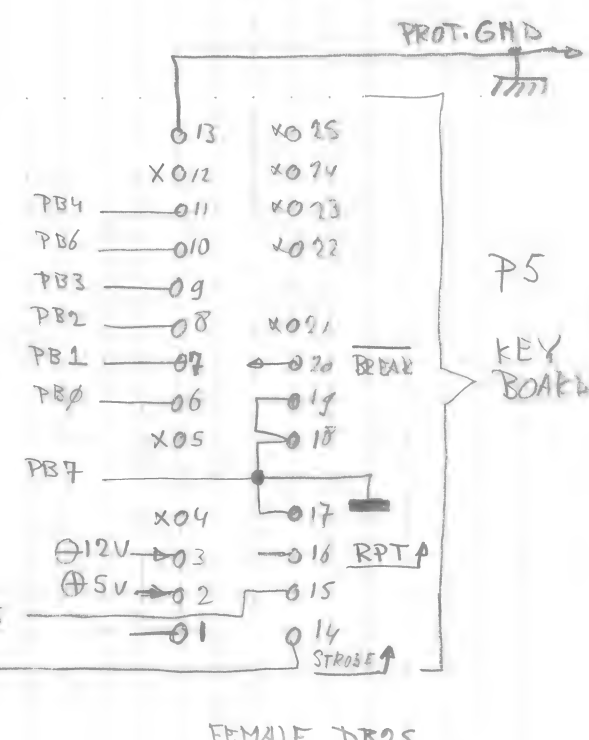
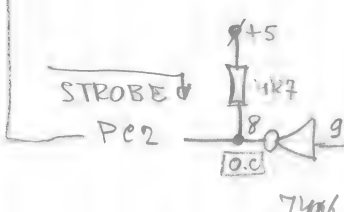




P6
SWIT.
LED



8255
I/O



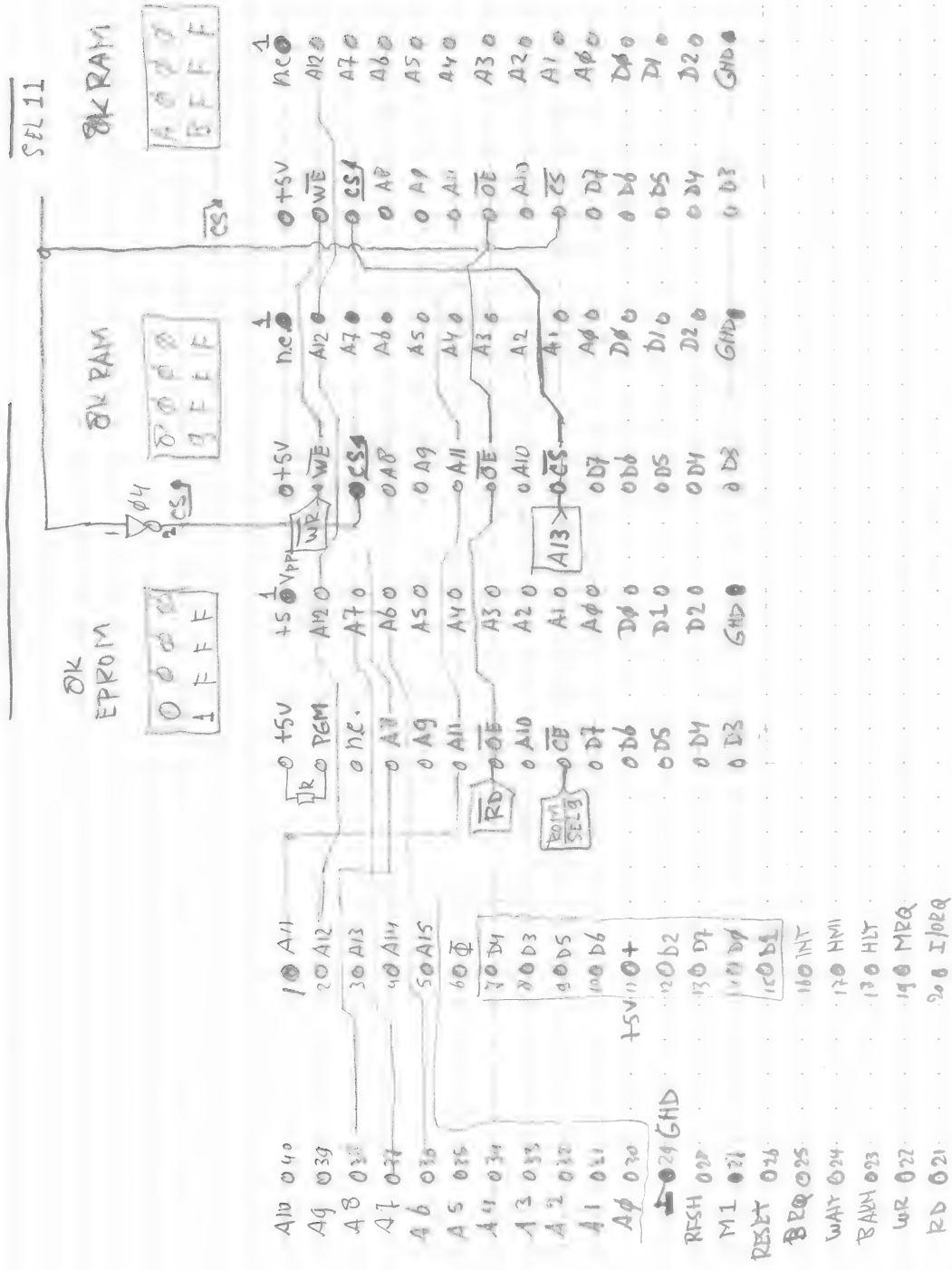
P5
KEY
BOARD

FEMALE DB25

ROM	0000	-	1FFF	OK	SEL9	(RD only)
I/O	4xx0	-	4xx3	LATCH 1	74LS374	SEL1 (WR only)
	4xx4	-	4xx7	LATCH 2	74LS374	SEL2 (WR only)
	4xx8	-	4xxB	Status	74LS244	SEL3 (RD only)
	4xxC	-	4xxF			
	4x10	-	4x13	Control I/O.	8255	SEL5 (RD+WR)
	4x14	-	4x17	PAR. Input.	8255	SEL6 (RD+WR)
	4x18	-	4x1B			
	4x1C	-	4x1F			
RAM.	8000	-	9FFF	OK		(RD+WR)
RAM.	A000	-	BFFF	OK		(RD+WR)

Soldeerzide

DIABLO



780 CPU

2764
ROM

6264
RAM

6264
RAM

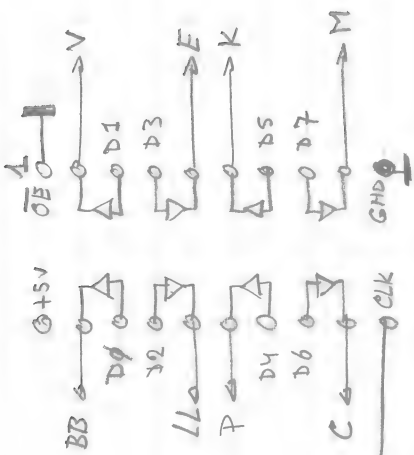
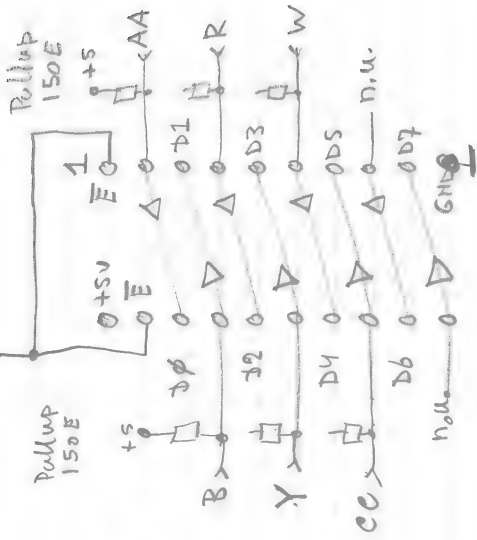
5562
O/H

SOLDERZIDE BOARD

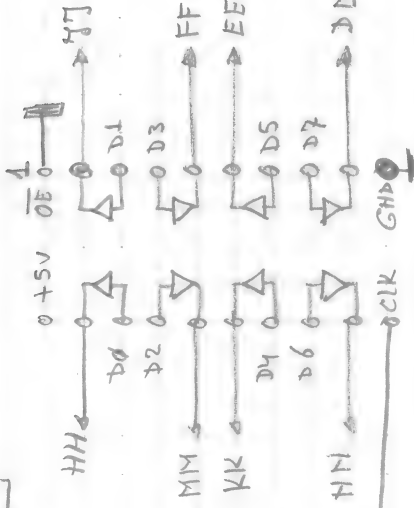
SEL3

LS244

LS374

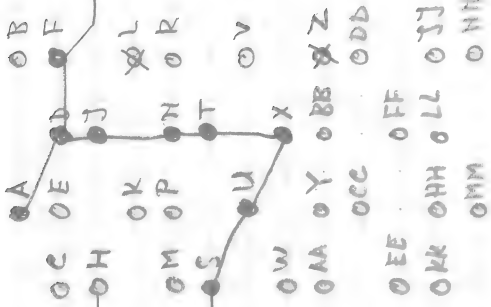
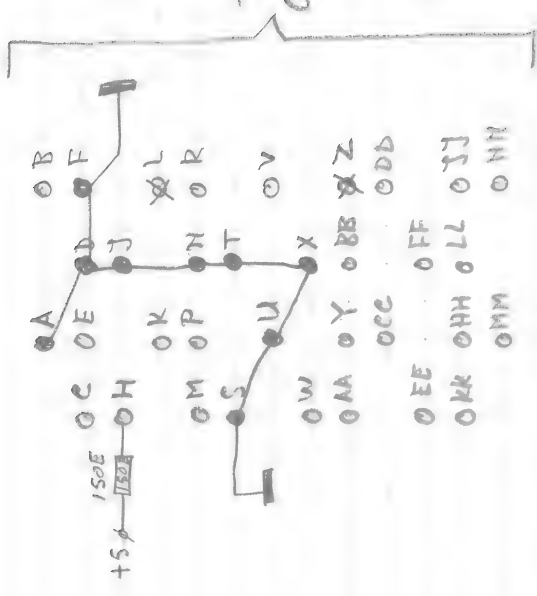


SEL2



LS374

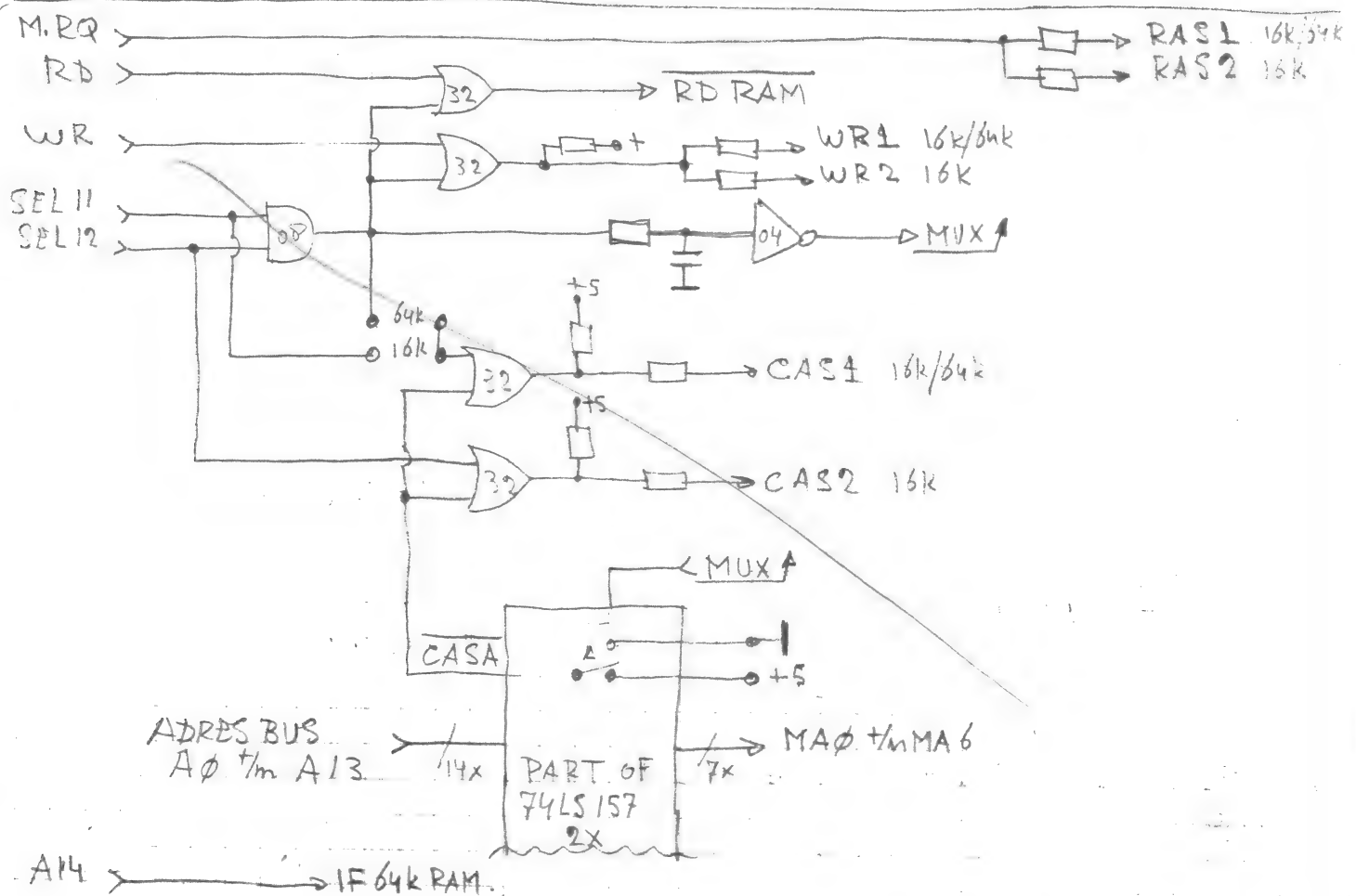
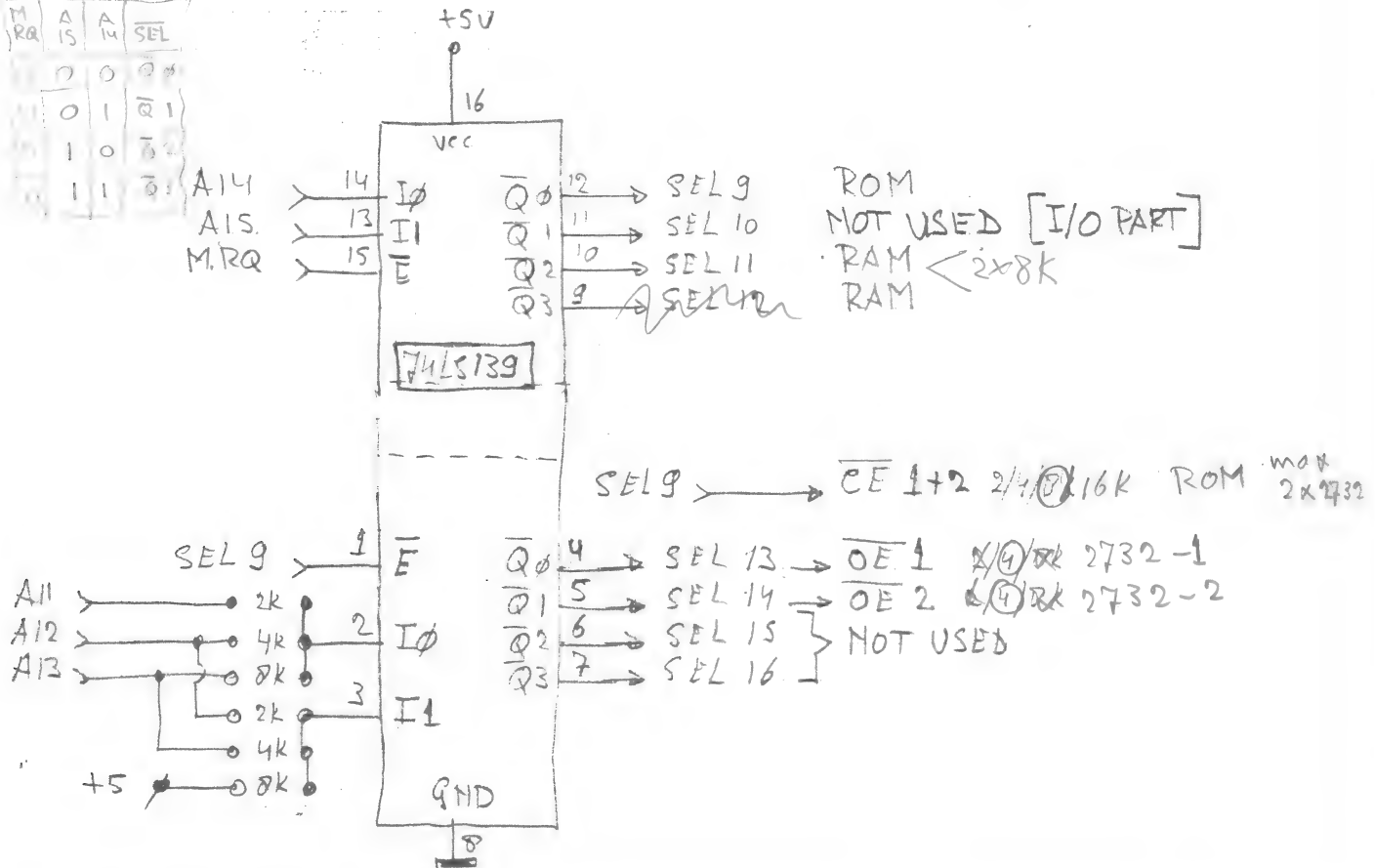
SEL1



ROM + RAM DECODING

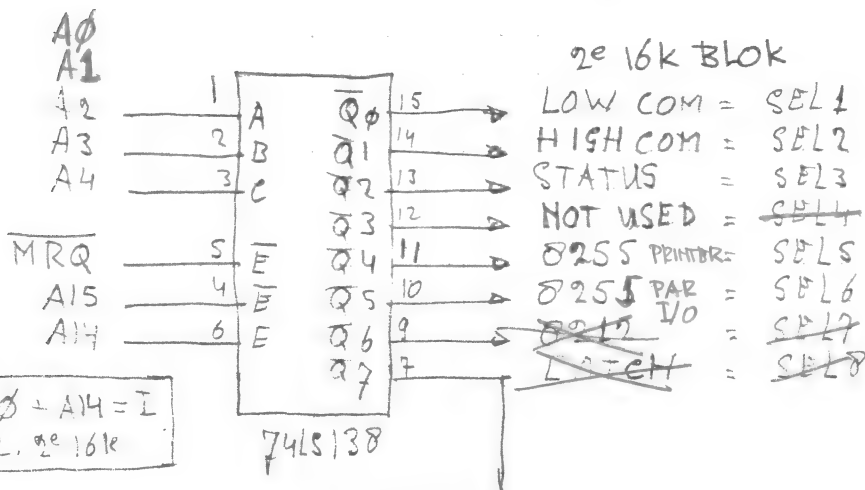
HCT 300

M/RQ	A15	A14	SEL
0	0	0	0
0	0	1	1
0	1	0	2
0	1	1	3



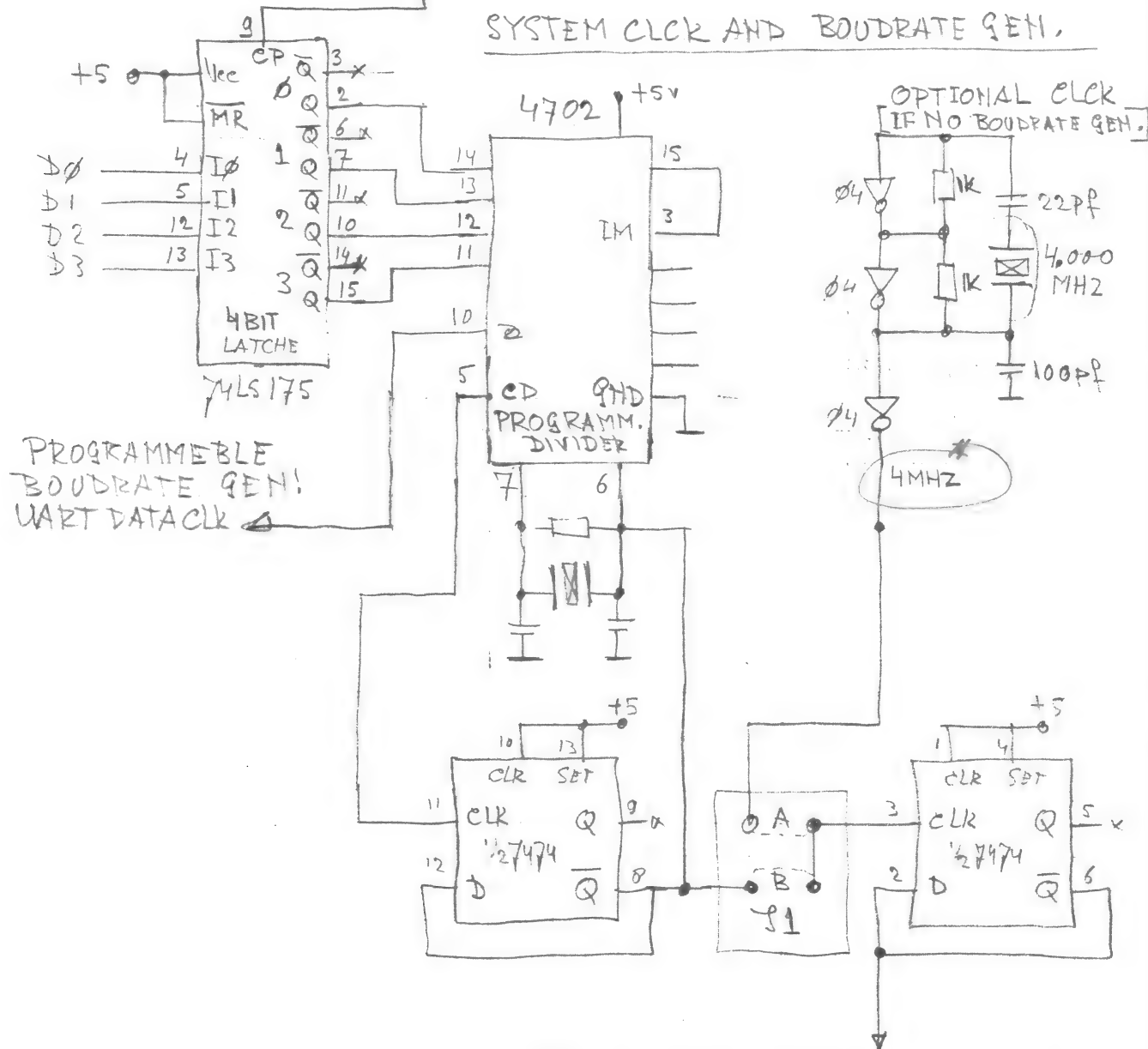
I/O DECODING

HCT 300



4000	4003
4004	4007
4008	400B
400E	400F
4010	4013
4014	4017
4018	401F

SYSTEM CLK AND BOUDRATE GEN.



74LS174A = 2MHz SYSTEM CLK cd 2MHz.

74LS174B = ... MHz SYSTEM CLK AND UART DATA CLK

Table keyboard cable matrix

+

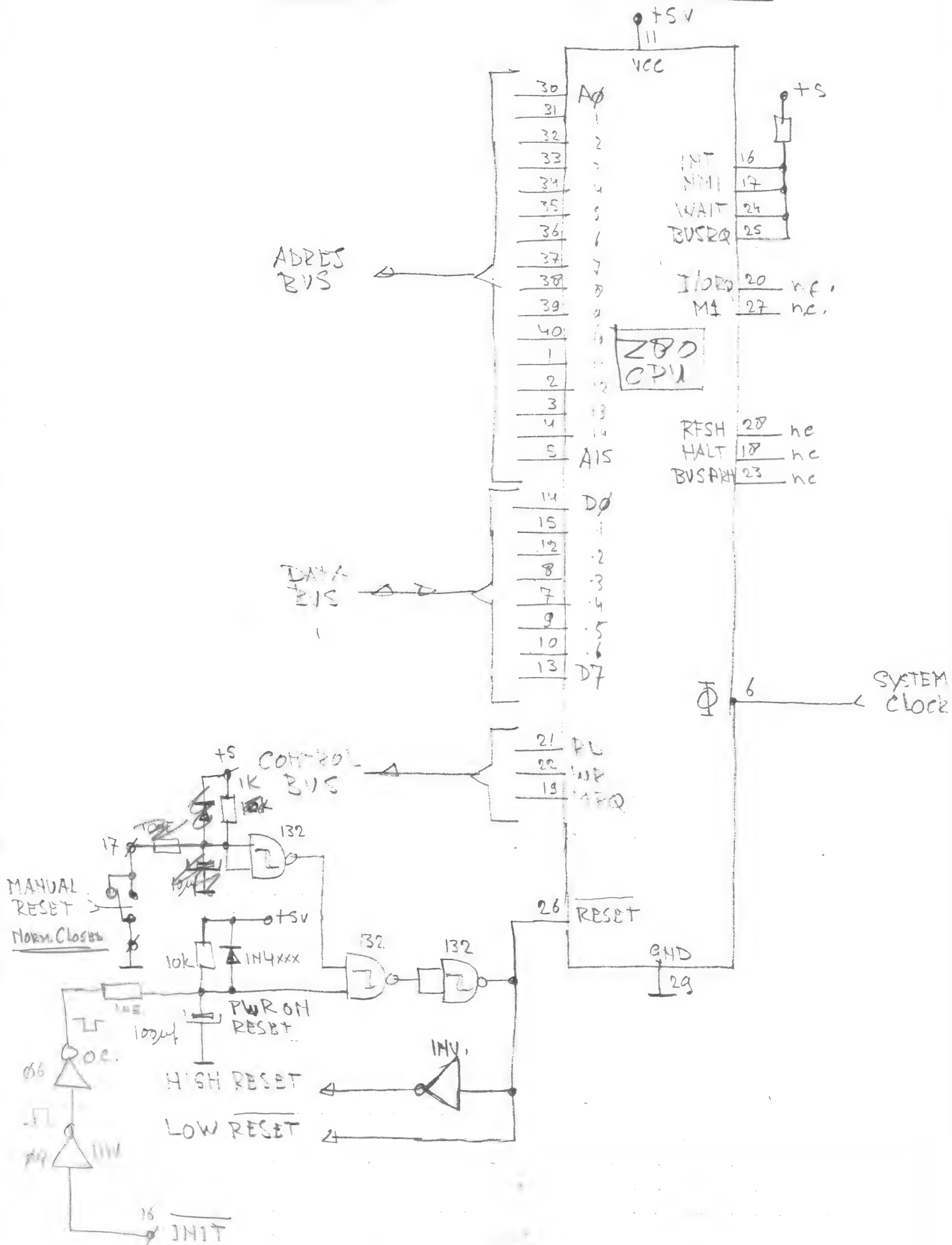
+5V
gnd

12
18/17/19

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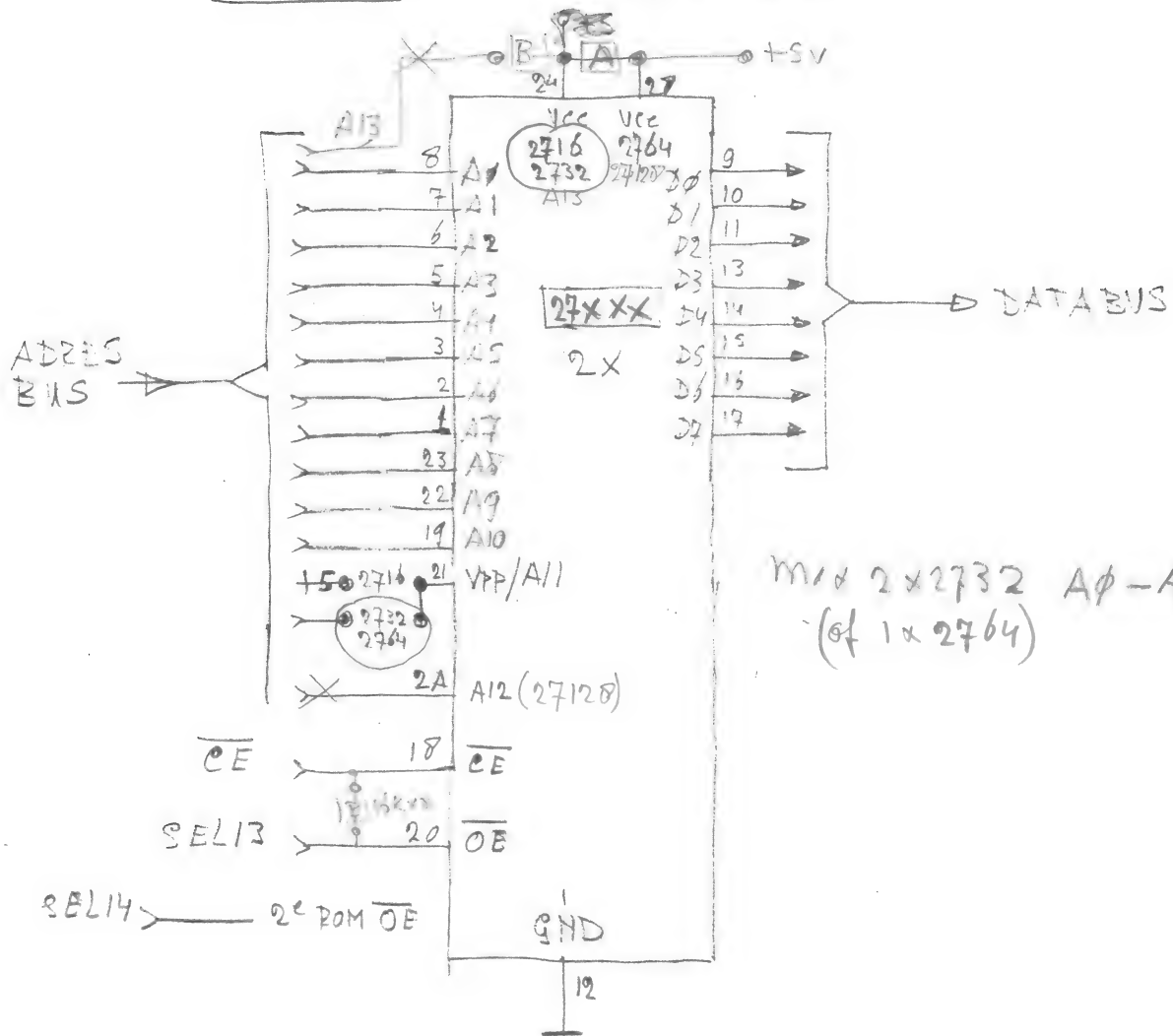
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HCT 300



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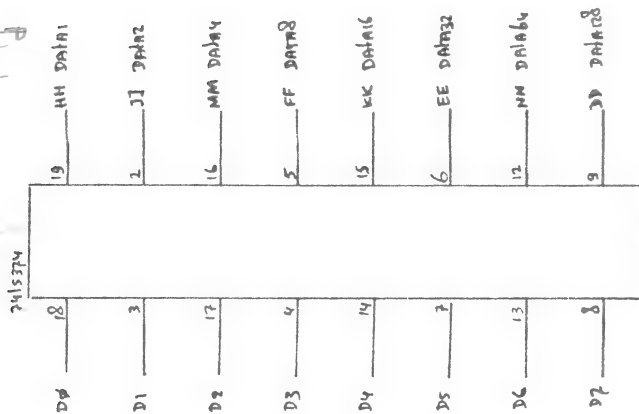
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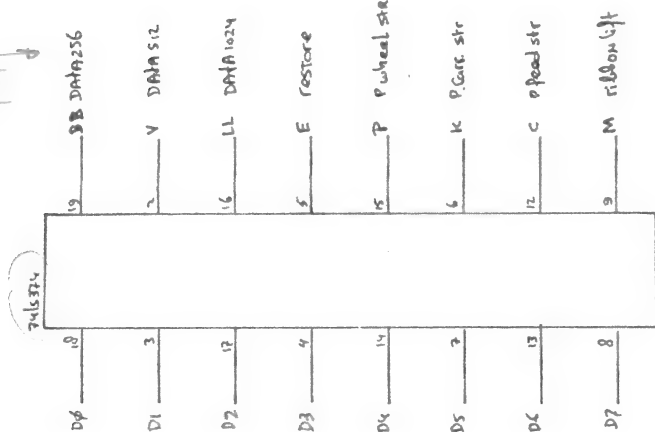
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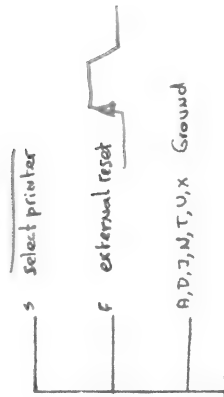
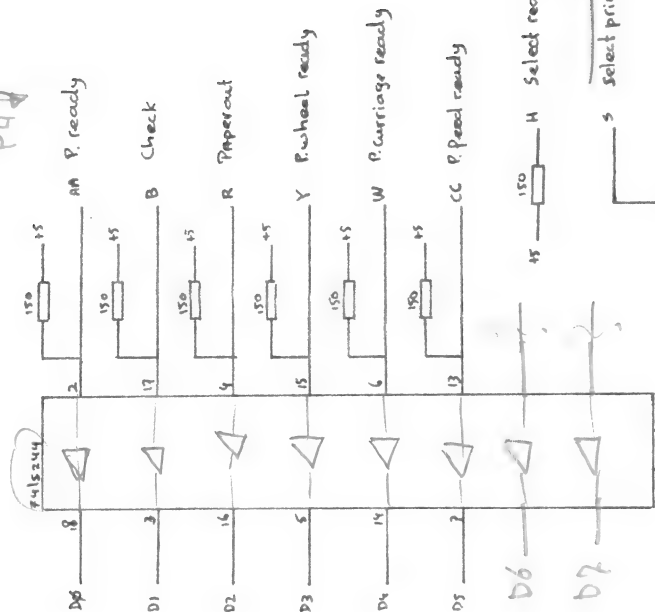
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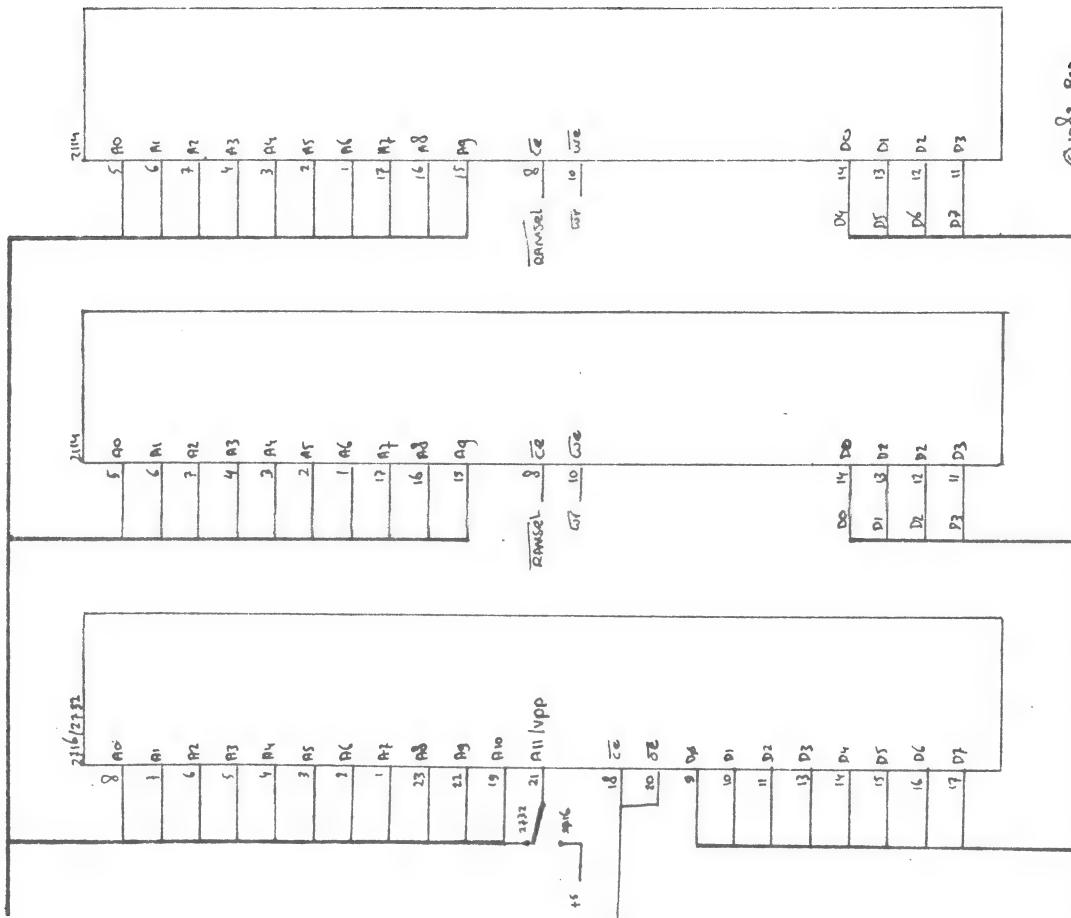
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P41

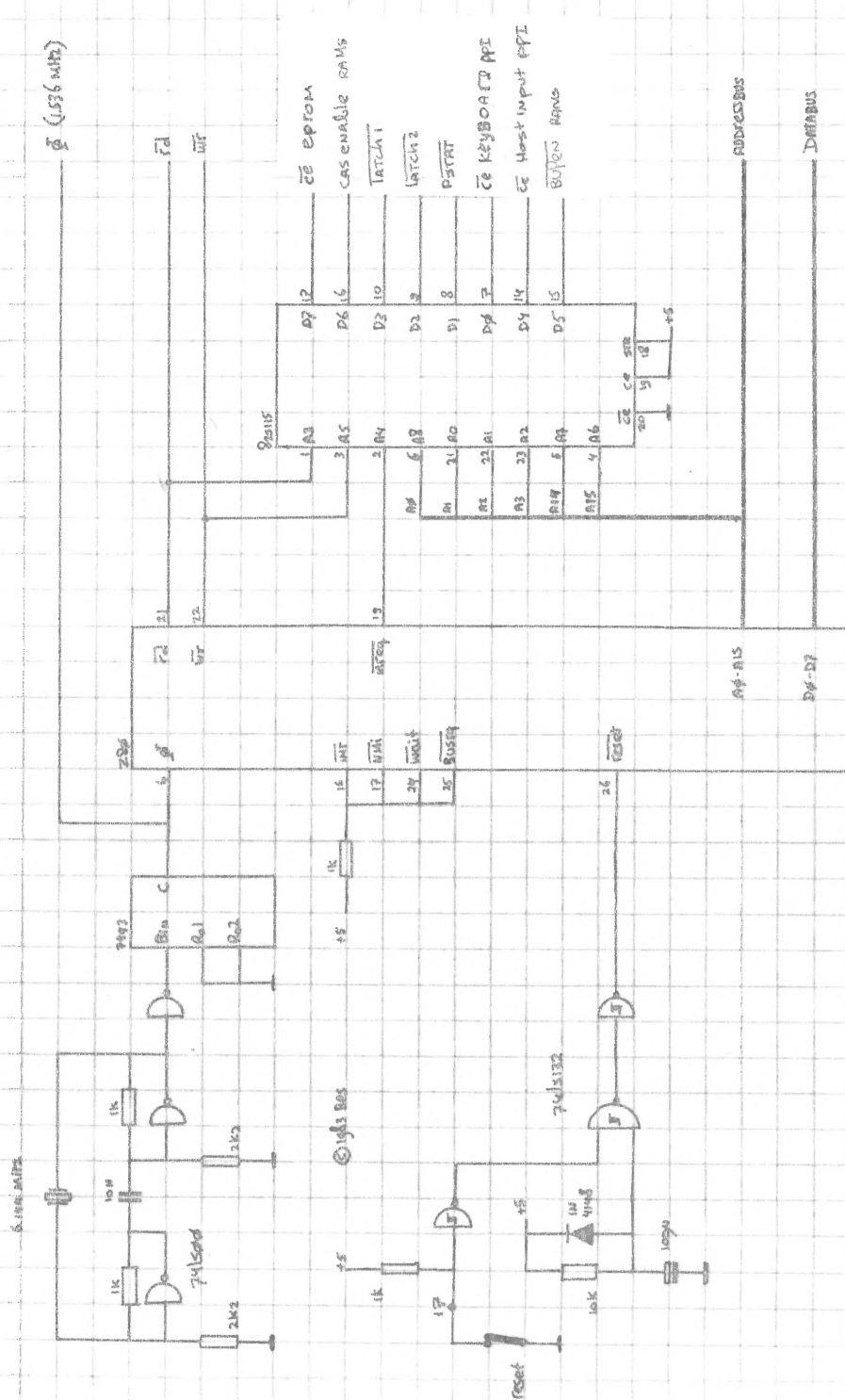
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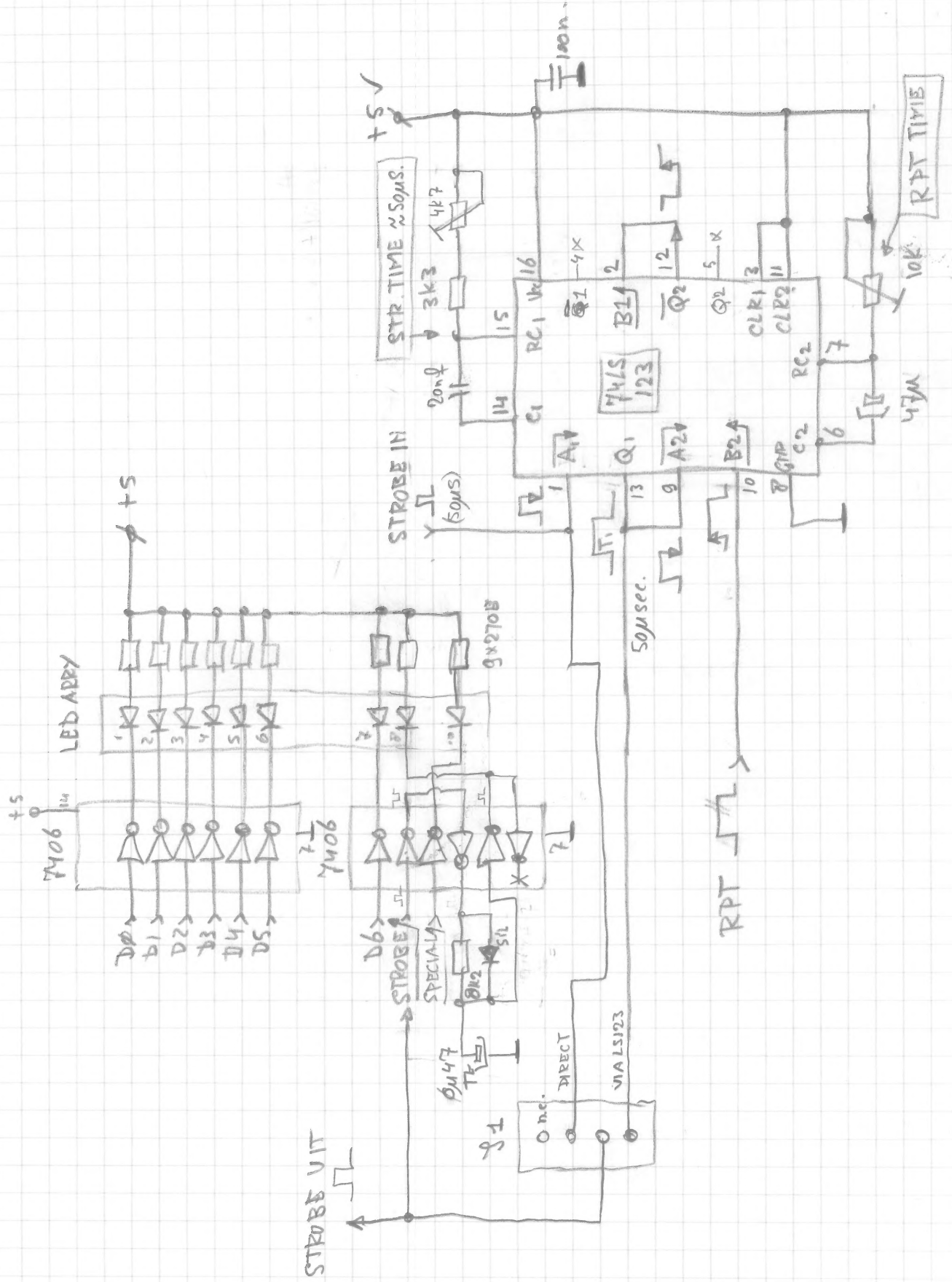
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cpu section



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D3	8	33				
D4	7	34				
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KEYBOARD MONITOR + RPT.



DIABLO MONITOR + RPT.

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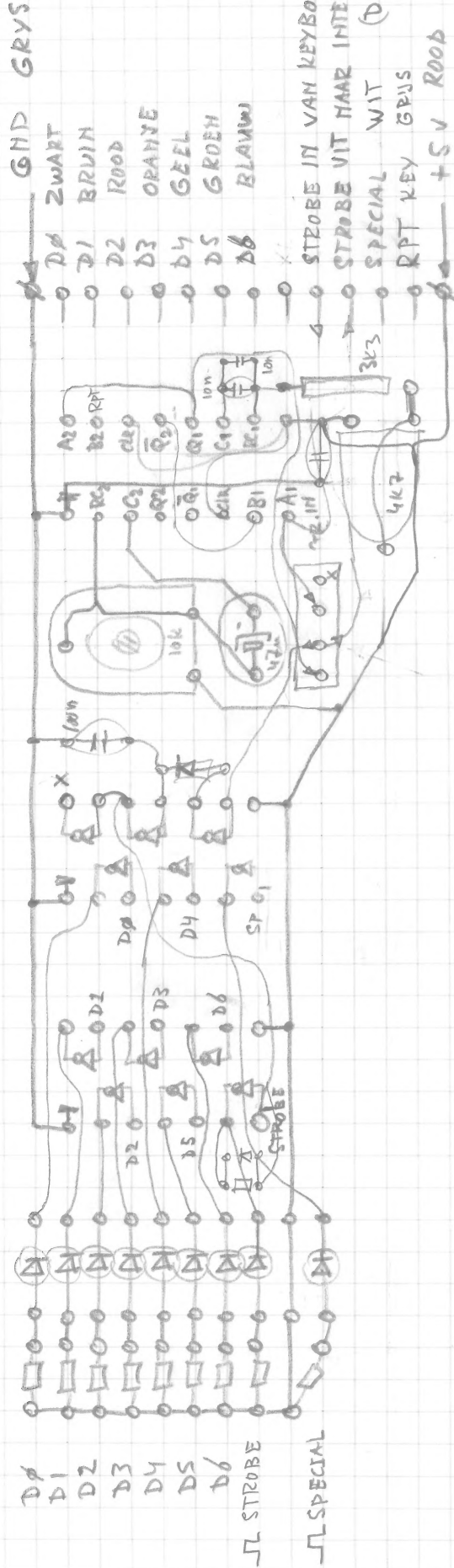
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D0
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SPECIAL



OUTPUT KEY
STROBE ST

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Via n.c.
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